

A SATISFACTORY TECHNIQUE FOR
REARING AGROMYZID FLIES FROM THE
LEAF MINING LARVAL STAGE¹

(Diptera: Agromyzidae)

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Rearing adults from mined leaves containing larvae is the most desirable method of collecting these small flies. Host records, mined leaves, larvae, and puparia, as well as the adults, are all valuable as aids in separating the many closely related species found in a number of genera, particularly *Liriomyza* Mik and *Phytomyza* Fallén.

The literature concerning the rearing of agromyzids is scant. Inchbald (1881) found the adults not difficult to rear, "if the collector will only imitate Nature in her ways and means." He found that an occasional light sprinkling of water was needed to supply moisture normally provided by rain or dew. Frost (1924) placed the mined leaves individually into small, round, seamless tin boxes or in tissue paper triangles as the mined leaves were collected in the field. The paper triangles were kept in a tin box. Upon returning to the laboratory, all larvae that had emerged and pupated were placed individually in small, one-dram vials, corked to prevent evaporation. With those species which pupated in the mines, a small section of leaf containing the pupa was cut out and placed in a stoppered vial.

In spite of the relatively dry climatic conditions occurring in California, lack of humidity was found to be the limiting factor when rearing the various species in the laboratory. None of the larvae of the numerous species reared by the writer was known to leave a desiccated leaf, crawl to another, and begin a new mine. Therefore, it was necessary to devise a method to keep the leaves fresh for a period of four or five days until the larvae had emerged or pupated at the end of the mine.

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Leaves containing mines of a particular species were gathered with petioles as long as possible. The collected leaves were segregated as to mine type, and kept in paper bags containing a damp paper towel and held shut by paper clips. Mines of all ages were included. Those from which the larvae had emerged were pressed in a standard plant press. The smaller, newer mines, although more difficult to detect, were preferred because parasitism by braconid and chalcidoid parasites became a crucial factor in rearing flies from mature larvae. Freshly externally parasitized larvae, *i. e.*, those that were motionless, but not discolored, made satisfactory specimens for preserving in alcohol.

Upon returning to the laboratory, the writer separated the leaves which were to be kept fresh from the others. The petioles were clipped back one-eighth to one-fourth of an inch from the original breaking point and the leaves immediately placed in water. The petioles of two to six leaves, depending upon the size, were then rolled together in wet cotton strips making a firm plug that could be forced into the top of a vial of water (fig. 1). To prevent the emerging larvae from falling to the water around the cotton plug and drowning, the vials were inverted.

Each vial was supported by a piece of wire—straightened paper clips proved convenient—having one end clamped around the neck of the vial. When the cotton plugs were fitted firmly, no leakage of water occurred. Each vial or series of vials holding leaves mined by the same species was then placed in a wide mouthed one-half pint or one pint jar. The lids of the jars previously had been cut out near the rim and covered with a fine mesh cloth. The vials were removed immediately after all larvae had emerged. The leaves frequently made satisfactory herbarium specimens. An inverted vial of water plugged with cotton was usually placed in the jars to increase humidity.

Some adults failed to emerge, particularly of those species whose larvae mine the leaves of plants associated with damp situations. As a result, it was found necessary to add about half an inch of fine, washed sand to the bottom of each jar. The sand was kept moist by adding water as needed, until all adults had emerged.

For economy of space, the pupae of each species passing through a winter diapause were placed in a small numbered vial covered with a fine mesh cloth held in place by a rubber band. As many

vials as possible were then placed upright in the jars, and the bottom of each jar was kept covered with about half an inch of water. With the cloth lids on the jars, the humidity remained sufficiently high to prevent pupal desiccation.

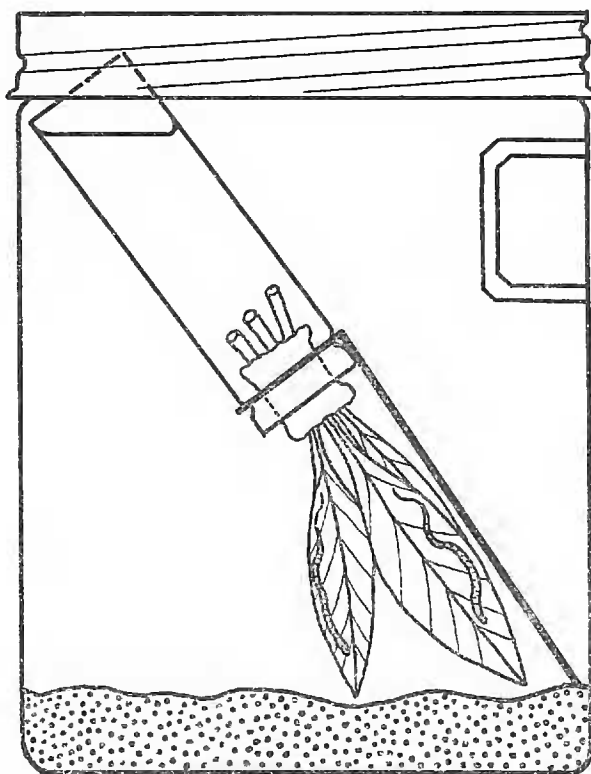


Fig. 1. Diagram of a rearing jar. The inverted vial within is supported by a piece of wire. Damp sand covers the bottom of the jar.

When a great number of leaves mined by a single species were encountered, as was often the case when agricultural crops were attacked, a high percentage of adult emergence was obtained simply by filling jars of suitable size (gallon jars often being required) with the mined leaves. The humidity created by the decomposing vegetation was sufficient to keep the leaves fresh until the larvae had emerged and pupated. Care was taken, however, to keep any liquid in which the pupae might have drowned, from collecting on the bottoms of the jars.

LITERATURE CITED

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